

REMARKS

I. Status Summary

Claims 1-14 are pending in the present application. Claims 1, 4 and 13 have been amended and claim 3 has been cancelled. Therefore, upon entry of this amendment, claims 1-2 and 4-14 will be pending. No new matter has been introduced by the present amendment. Reconsideration of the application as amended and based on the arguments set forth hereinbelow is respectfully requested.

II. Claim Rejections under 35 U.S.C. § 102

Claims 1, 3, 4, and 11-14 stand rejected under 35 U.S.C. § 102(a) and 102(e) as being anticipated by U.S. Patent No. 6,653,897 to Sawashi (hereinafter, "Sawashi"). These rejections are respectfully traversed.

Independent claim 1 recites a line driver arrangement comprising a differential class-D switching amplifier having a switching frequency. Further, claim 1 recites that the differential class-D amplifier receives a dual line input transmit signal and outputs an amplified dual line transmit signal. Claim 1 also recites a transformer having a predetermined leakage inductance, having a primary winding for receiving the amplified dual line transmit signal, and having a secondary winding for outputting a transformed dual line signal as a dual line output transmit signal (see, for example, Figures 6 and 7 as filed). Further, claim 1 recites that the leakage inductance is predetermined for low pass filtering of the amplified dual line transmit signal. Summarily, Sawashi does not teach each and every element of the presently amended independent claim 1.

Independent claim 13 recites a transformer for use in a line driver arrangement. Further, claim 13 recites that the line driver arrangement comprises a differential amplifier for receiving a dual line input transmit signal and outputting an amplified dual line transmit signal. Claim 13 also recites that the transformer comprises a primary winding for receiving the amplified dual line transmit signal and a secondary winding for outputting a transformed dual line signal as a dual line output transmit signal, wherein the transformer has a predetermined leakage inductance and/or stray capacitance. Further, claim 13 recites that the leakage inductance and/or stray capacitance is predetermined for low pass filtering of the amplified dual line transmit signal. Summarily, Sawashi also does not teach each and every element of the presently amended independent claim 13.

Sawashi is directed to a power amplifier apparatus including a pair of power amplifiers for performing switching-type power amplification, a transformer, and a capacitor. The power amplifier apparatus is particularly adapted to be used as an audio amplifier (see column 3, lines 3-5 of Sawashi). Referring to Figure 3 of Sawashi and corresponding parts of the description, a digital audio signal **P31** is split into two pulse-width modulated signals **+P32**, **-P32** which are 180 degrees out of phase. As such, two branches of PWM-signals are created. These two branch signals **+P32**, **-P32** cannot be considered as a single dual line transmit signal.

Furthermore, according to Sawashi, each branch signal **+P32**, **-P32** is fed into a respective class-D power amplifier **33A**, **33B** separately and output as a PWM-signals **+P33**, **-P33**. Additionally, two coils **34A**, **34B** in Sawashi are connected in series through a loudspeaker **14** so as to connect the output terminal of the class-D amplifier

33A of the upper branch with the output of the class-D amplifier **33B** of the lower branch. According to Sawashi, the windings **34A**, **34B** are arranged in a transformer-like fashion. It is essential for the audio amplifier of Sawashi to have a 180 degree phase shift between the PWM-signals **+P32**, **-P32** for the upper and lower branch. Otherwise, the self-inductances of coils **34A**, **34B** do not cancel each other out (see column 3, lines 41-45 of Sawashi).

In contrast to Sawashi, claims 1 and 13 as presently amended recite that a differential or dual line signal is fed into the primary winding of a transformer, and a transformed signal can be tapped at the secondary winding of the transformer to be used as a dual line output transmit signal. Also in contrast to the 180 degree phase shift in Sawashi, the signals as fed into the primary winding defined in presently amended claims 1 and 13 are always in-phase. Additionally, it is noted that Sawashi does not teach a coupling transformer as defined in presently amended claims 1 and 13 but rather refers to a low-pass filter in a prior art audio amplifier as it is depicted, for example, in Figure 4 (prior art) of the present application as originally filed.

Summarily, Sawashi discloses: (1) a stereo power amplifier (see column 4, lines 39-40); (2) coils or inductances needing to be connected in series (see column 4, line 46); and (3) two class-D amplifiers producing two single-ended PWM-signals being 180 degrees out of phase. In contrast to the amplifier apparatus of Sawashi, the present invention comprises: (1) a line driver arrangement essentially for xDSL-applications; (2) a transformer consisting of primary and secondary windings for de-coupling a subscriber line from a central office or customer premises; and (3) a single differential

class-D switching amplifier providing a dual line amplified transmit signal to the primary winding of the transformer.

Because Sawashi fails to disclose each and every element recited by claims 1 and 13, applicants respectfully submit that Sawashi does not anticipate the subject matter recited by claims 1 and 13. Claim 3 has been cancelled. Claims 4 and 11-12 depend from claim 1 and claim 14 depends from claim 13. Therefore, the comments presented above relating to claims 1 and 13 apply equally to claims 4, 11-12, and 14. As such, applicants respectfully request that the rejection of claims 1, 4, and 11-14 under 35 U.S.C. § 102(a) and 102(e) as being anticipated by Sawashi be withdrawn and the claims allowed at this time.

III. Claim Rejections Under 35 U.S.C. § 103

Claims 5 and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sawashi, as applied to claim 1, and further in view of U.S. Patent No. 6,091,206 to Siao (hereinafter, "Siao"). Additionally, claims 2 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sawashi, as applied to claim 1, and further in view of U.S. Patent No. 6,535,108 to Schrott et al. (hereinafter, "Schrott"). Further, claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sawashi, as applied to claim 1, and further in view of U.S. Patent Application Publication No. 2003/0095000 to Ramage et al. (hereinafter, "Ramage"). Additionally, claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sawashi, as applied to claim 1, and further in view of Applicants' Admitted Prior Art (hereinafter, "AAPA"). Finally, claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over

Sawashi, modified by Siao as applied to claim 5, and further in view of U.S. Patent Application Publication No. 2003/0042801 to Miyajima et al. (hereinafter, "Miyajima"). These rejections are respectfully traversed.

III.A. Rejection of Claims 5 and 6 Based Upon Sawashi and Siao

Claims 5 and 6 depend from claim 1. Therefore, claims 5 and 6 include the features of claim 1. As set forth above, Sawashi refers to audio amplifiers and employs serially connected coils in a loop, and does not teach the presently amended claim 1 features, including for example, a transformer having a primary winding for receiving an amplified dual line transmit signal and having a secondary winding for outputting a transformed dual line signal as a dual line output transmit signal. In addition, applicants respectfully submit that Sawashi does not suggest these claim 1 features. Siao fails to overcome the significant shortcomings of Sawashi.

Siao is directed to an electronic ballast system for fluorescent lamps. The ballast system disclosed by Siao includes a transformer **11**, a power oscillator **12** connected to the primary of the transformer, and a ballasting network **13** connected to the secondary of the transformer. (Siao, column 2, lines 28-32). Further, Siao discloses that power oscillator **12** is a class-D power oscillator. (Siao, column 2, lines 52-55). Various discrete circuit elements are used to achieve a resonating network at a frequency close to a predetermined frequency range. (Siao, column 1, lines 53-55, and column 2, line 64, to column 3, line 5). Siao does not disclose or suggest a transformer having primary and secondary windings, as required by claims 5 and 6 (based upon dependence on claim 1).

For the reasons provided above with respect to claims 5 and 6, applicants respectfully submit that the teachings of Sawashi and Siao cannot be combined to either teach or suggest each and every element required by claims 5 and 6, and therefore, that claims 5 and 6 are not obvious in view of the cited references. Applicants, therefore, respectfully request that the rejection of claims 5 and 6 under 35 U.S.C. §103(a) be withdrawn and the claims allowed at this time.

III.B. Rejection of Claims 2 and 8 Based Upon Sawashi and Schrott

Claims 2 and 8 depend from claim 1. Therefore, claims 2 and 8 include the features of claim 1. As set forth above, Sawashi refers to audio amplifiers and employs serially connected coils in a loop, and does not teach the presently amended claim 1 features, including for example, a transformer having a primary winding for receiving an amplified dual line transmit signal and having a secondary winding for outputting a transformed dual line signal as a dual line output transmit signal. In addition, applicants respectfully submit that Sawashi does not suggest these claim 1 features. Schrott fails to overcome the significant shortcomings of Sawashi.

Schrott is directed to a transponder having a resonant RLC circuit with one or more electromagnetic energy storage components that vary in response to an externally applied modulating energy field. In addition to the externally modulating energy field, a base station transmits a carrier signal with a frequency essentially the same as the quiescent resonant frequency of the RLC circuit. As the component(s) vary, the resonant frequency of the RLC circuit changes, modulating the carrier signal with the external modulating energy field. Effects of the modulation are detected by the base

station. Information (e.g., the presence of a tag) is obtained by receiving and demodulating the modulated signal at the base station. One or more of the circuit elements (e.g. different preferred embodiments of one or more capacitors, inductors, and resistors) can be varied (e.g. mechanically) to modulate the carrier signal. This allows the resonant circuit to modulate the carrier signal with multiple modulation frequencies to encode multiple bits of information on the carrier. Schrott relates to a modulation method of resonant frequencies in RLC circuits and does not appear to be pertinent to the subject matter of the current invention (i.e., line driver arrangements for xDSL-applications). Schrott also does not disclose or suggest a transformer having primary and secondary windings, as required by claims 2 and 8 (based upon dependence on claim 1).

For the reasons provided above with respect to claims 2 and 8, applicants respectfully submit that the teachings of Sawashi and Schrott cannot be combined to either teach or suggest each and every element required by claims 2 and 8, and therefore, that claims 2 and 8 are not obvious in view of the cited references. Applicants, therefore, respectfully request that the rejection of claims 2 and 8 under 35 U.S.C. §103(a) be withdrawn and the claims allowed at this time.

III.C. Rejection of Claim 9 Based Upon Sawashi and Ramage

Claim 9 depends from claim 1. Therefore, claim 9 includes the features of claim 1. As set forth above, Sawashi refers to audio amplifiers and employs serially connected coils in a loop, and does not teach the presently amended claim 1 features, including for example, a transformer having a primary winding for receiving an amplified

dual line transmit signal and having a secondary winding for outputting a transformed dual line signal as a dual line output transmit signal. In addition, applicants respectfully submit that Sawashi does not suggest these claim 1 features. Ramage fails to overcome the significant shortcomings of Sawashi.

Ramage is directed to a power amplifier for use in audio applications. Referring to Figure 1, a transformer **30** is impedance matched to an acoustic transducer system (i.e., a loudspeaker). (Ramage, paragraph 31). The low-pass filtering disclosed by Ramage is achieved by circuitry components **22**, **26**, **23**, and **27**. (Ramage, paragraph 30). Filters **22** and **23** of Figure 1 do not relate to transformer **30** as to the functions of receiving an amplified transmit signal and outputting a transformed signal. Instead, filters **22** and **23** relate to power factor correction circuitry as indicated by PFC modules **24** and **25**. (Ramage, paragraph 30). Ramage teaches low-pass filtering after the power amplifier is achieved by additional low-pass filters. (Ramage, paragraph 39). Ramage does not disclose or suggest a transformer having primary and secondary windings, as required by claim 9 (based upon dependence on claim 1).

For the reasons provided above with respect to claim 9, applicants respectfully submit that the teachings of Sawashi and Ramage cannot be combined to either teach or suggest each and every element required by claim 9, and therefore, that claim 9 is not obvious in view of the cited references. Applicants, therefore, respectfully request that the rejection of claim 9 under 35 U.S.C. §103(a) be withdrawn and the claim allowed at this time.

III.D. Rejection of Claim 10 Based Upon Sawashi and AAPA

Claim 10 depends upon claim 1. Therefore, claim 10 includes the features of claim 1. As set forth above, Sawashi refers to audio amplifiers and employs serially connected coils in a loop, and does not teach the presently amended claim 1 features, including for example, a transformer having a primary winding for receiving an amplified dual line transmit signal and having a secondary winding for outputting a transformed dual line signal as a dual line output transmit signal. In addition, applicants respectfully submit that Sawashi does not suggest these claim 1 features. AAPA fails to overcome the significant shortcomings of Sawashi.

Referring to the Official Action, the Examiner stated that AAPA discloses a line driver arrangement utilizing class-D power amplifiers having a power spectral density that complies with ADSL standards. (Official Action, page 6). In contrast, dependent claim 10 requires (based upon dependence on claim 1) the features of a transformer having primary and secondary windings. AAPA does not disclose or suggest a transformer having primary and secondary windings, as required by claim 10 (based upon dependence on claim 1).

For the reasons provided above with respect to claim 10, applicants respectfully submit that the teachings of Sawashi and AAPA cannot be combined to either teach or suggest each and every element required by claim 10, and therefore, that claim 10 is not obvious in view of the cited references. Applicants, therefore, respectfully request that the rejection of claim 10 under 35 U.S.C. §103(a) be withdrawn and the claim allowed at this time.

III.E. Rejection of Claim 7 Based Upon Sawashi, Siao, and Miyajima

Claim 7 depends from claim 1. Therefore, claim 7 includes the features of claim 1. As set forth above, neither Sawashi nor Siao alone or in combination discloses or suggests a transformer having primary and secondary windings, as required by claim 7 (based upon dependence on claim 1). Miyajima fails to overcome the significant shortcomings of Sawashi and Siao.

Miyajima is directed to an electromagnetic drive type actuator. As stated by the Examiner, Miyajima discloses a low pass filter having a cutoff frequency that is lower than the resonance frequency. (Miyajima, paragraph 109). However, Miyajima fails to disclose or suggest a transformer having primary and secondary windings, as required by claim 7 (based upon dependence on claim 1).

For the reasons provided above with respect to claim 7, applicants respectfully submit that the teachings of Sawashi, Siao, and Miyajima cannot be combined to either teach or suggest each and every element required by claim 7, and therefore, that claim 7 is not obvious in view of the cited references. Applicants, therefore, respectfully request that the rejection of claim 7 under 35 U.S.C. §103(a) be withdrawn and the claim allowed at this time.

CONCLUSION

In light of the above Amendments and Remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Amendments and Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

DEPOSIT ACCOUNT

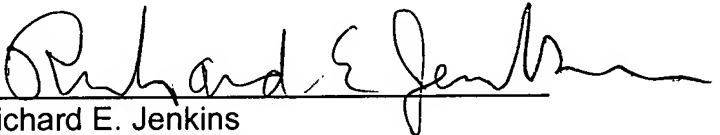
The Commissioner is hereby authorized to charge any fees associated with the filing of this correspondence to Deposit Account No. 50-0426.

Respectfully submitted,

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